

Cryogenic Cooling System for Zero-Venting Storage of Supercritical Air Packs, Phase II

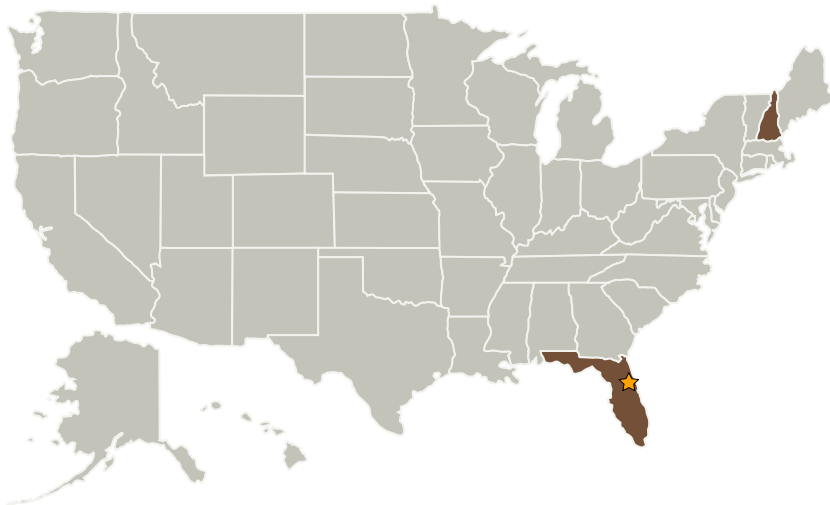
Completed Technology Project (2005 - 2007)



Project Introduction

Supercritical air at cryogenic temperature is an attractive source of breathing air because of its very high density and low pressure. However, heat leak into the cryogenic tank causes the stored air to expand and vent, thus limiting the storage life of a charged system. We propose to develop a storage system for supercritical air packs that provides cryogenic cooling that will enable long-term storage of charged, supercritical air packs with zero venting. In Phase I we proved feasibility through design trade-off and optimization analyses that led to a conceptual design and operational description of a supercritical air storage system. The innovative, mechanical cryocooling system provides flexible coupling and quick disconnection, as well as high reliability and efficient, low-power operation. The system can be used to charge the tanks with supercritical air without the use of expendable cryogens. In Phase II we will build and demonstrate a prototype storage system for supercritical air self-contained breathing apparatus (SCBAs). Critical components will be designed and tested individually, then integrated to produce a complete cooling system. We will couple the Phase II prototype with a supercritical air pack and demonstrate long-term storage with zero venting.

Primary U.S. Work Locations and Key Partners



Cryogenic Cooling System for Zero-Venting Storage of Supercritical Air Packs, Phase II

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Cryogenic Cooling System for Zero-Venting Storage of Supercritical Air Packs, Phase II

Completed Technology Project (2005 - 2007)



Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Creare LLC	Supporting Organization	Industry	Hanover, New Hampshire

Primary U.S. Work Locations	
Florida	New Hampshire

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.1 In-space Propellant Storage & Utilization